Dräger
MEDICAL

Evita 4 DC

DC Power Pack

Addendum to
Operating Instructions
Evita 4 / Evita 2 dura

1-178-95

Dräger

NOTICE

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Important Safety Information

Operator's Responsibility for Patient Safety

For correct and effective use of the product and in order to avoid hazards it is mandatory to carefully read and to observe all portions of this manual.

The design of the intensive care ventilators this device is intended to be used with, accompanying literature, and the labeling on the equipment take into consideration that the purchase and use of the equipment are restricted to trained professionals, and that certain inherent characteristics of the equipment are known to the trained operator. Instructions, warnings, and caution statements are limited, therefore, largely to the specifics of the Draeger design. This publication excludes references to various hazards which are obvious to a medical professional and operator of respiratory care equipment, to the consequences of misuse of such equipment, and to potentially adverse effects in patients with abnormal conditions. Product modification or misuse can be dangerous. Draeger Medical, Inc. disclaims all liability for the consequences of product alterations or modifications, as well as for the consequences which might result from uses of the product not covered by its intended use or from the combination of this product with other products whether supplied by Draeger or by other manufacturers if such a combination is not endorsed by Draeger Medical, Inc..

The operators of ventilator systems must recognize their responsibility for choosing appropriate safety monitoring that supplies adequate information on equipment performance and patient condition. Patient safety may be achieved through a wide variety of different means ranging from electronic surveillance of equipment performance and patient condition to simple, direct observation of clinical signs. The responsibility for the selection of the best level of patient monitoring lies solely with the equipment operator.

Limitation of Liability

Draeger Medical, Inc.'s liability, whether arising out of or related to manufacture and sale of the goods, their installation, demonstration, sales representation, use, performance, or otherwise, including any liability based upon Draeger Medical, Inc.'s Product Warranty, is subject to and limited to the exclusive terms and conditions as set forth, whether based upon breach of warranty or any other cause of action whatsoever, regardless of any fault attributable to Draeger Medical, Inc. and regardless of the form of action (including, without limitation, breach of warranty, negligence, strict liability, or otherwise).

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Draeger Medical, Inc. shall not be liable for, nor shall buyer be entitled to recover any special incidental, or consequential damages or for any liability incurred by buyer to any third party in any way arising out of or relating to the goods.

Warranty

All Draeger products are guaranteed to be free of defects for a period of one year from date of delivery. The following are exceptions to this warranty:

1. The defect shall be a result of workmanship or material. Defects caused by misuse, mishandling, tampering, or by modifications not authorized by Draeger Medical, Inc. or its representatives are not covered.
2. Rubber and plastic components and materials are warranted to be free of defects at time of delivery.
3. Oxygen sensors capsules have a six-month limited warranty from the date of delivery.

Any product which proves to be defective in workmanship or material will be replaced, credited, or repaired with Draeger Medical, Inc. holding the option. Draeger Medical, Inc. is not responsible for deterioration, wear, or abuse. In any case, Draeger Medical, Inc. will not be liable beyond the original selling price.

Application of this warranty is subject to the following conditions:

1. Draeger Medical, Inc. or its authorized representative must be promptly notified, in writing, upon detection of the defective material or equipment.
2. Defective material or equipment must be returned, shipping prepaid, to Draeger or its authorized representative.
3. Examination by Draeger Medical, Inc. or its authorized representative must confirm that the defect is covered by the terms of this warranty.
4. Notification in writing, of defective material or equipment must be received by Draeger Medical, Inc. or its authorized representative no later than two (2) weeks following expiration of this warranty.

In order to assure complete protection under this warranty, the Customer Registration Card and/or Periodic Manufacturer's Service Record (if applicable) must be returned to Draeger within ten (10) days of receipt of the equipment.

The above is the sole warranty provided by Draeger Medical, Inc. No other warranty expressed or implied is intended. Representatives of Draeger are not authorized to modify the terms of this warranty.

Draeger Medical, Inc., Telford, PA

Definitions

WARNING !

A WARNING statement refers to conditions with a possibility of personal injury if disregarded.

CAUTION !

A CAUTION statement designates the possibility of damage to equipment if disregarded.

NOTE: A NOTE provides additional information intended to avoid inconveniences during operation.

Inspection	=	examination of actual condition
Service	=	measures to maintain specified condition
Repair	=	measures to restore specified condition
Maintenance	=	inspection, service, and repair, where necessary
Preventive Maintenance	=	Maintenance measures at regular intervals

Typing conventions in this manual

Controls (hard keys and screen keys / knobs / fields) are designated as »**Control Name**«, e.g.

»**Configuration**«

Screen pages are indicated as »Screen page«, e.g.

»Measured values«

On-screen messages are printed in **bold**, e.g.

The DC power pack is in operation

General WARNINGS and CAUTIONS

WARNING !

Strictly follow Operator's Instruction Manuals

Any use of the product requires full understanding and strict observation of all portions of these instructions as well as the Operating Instructions of the Evita 4 and Evita 2 dura ventilators, respectively. The equipment is only to be used for the purpose specified under "Intended Use" (page 8). Observe all WARNINGS and CAUTIONS as rendered throughout the manuals and on labels on the equipment.

WARNING !

DANGER, risk of explosion if used in the presence of flammable anesthetics.

The equipment is neither approved nor certified for use in areas where combustible or explosive gas mixtures with air or with nitrous oxide are likely.

WARNING !

Electrical connections to equipment which is not listed in these Operating Instructions should only be made following consultations with the respective manufacturers or a qualified expert.

CAUTION !

Restriction of Distribution

Federal Law and Regulations in the United States and Canada restrict this device to sale by or on the order of a physician.

CAUTION !

Accessories

Use only accessories listed in the Ordering Information (page 22).

Precautions During Preparation

WARNING !

Installation of the Evita 4 DC Power Pack may be performed by factory trained and authorized service personnel only.

WARNING !

Only use rechargeable batteries !

Explosion hazard!

Single use batteries may explode when being charged with the DC power pack while ventilator is operating on line power.

WARNING !

Do not connect any devices that are operated by line voltage to the external battery connection socket of the ventilator.

CAUTION !

Only use sealed gel type lead-acid batteries of sufficient capacity as specified, see page 20.

Precautions During Operation

WARNING !

Do not connect any devices that are operated by line voltage to the external battery connection socket of the ventilator.

CAUTION !

Line power and an on-board DC vehicle power supplies must never be connected at the same time, as Evita 4/Evita 2 dura would attempt to charge the vehicle power supply.

Precautions During Maintenance

WARNING !

To avoid any risk of infection, clean and disinfect ventilator and accessories before any maintenance according to established hospital procedures - this applies also when returning ventilators or parts for repair.

WARNING !

Preventive Maintenance work on the Evita 4 ventilator and its components may be performed by trained and factory authorized staff only.

WARNING !

Never operate the ventilator if it has suffered physical damage or does not seem to operate properly. In this case always refer servicing to properly trained and factory authorized service personnel.

WARNING !

Treatment of batteries :

Do not throw into fire! Risk of explosion.

Do not force open! Danger of bodily injury.

Follow all local, state, and federal regulations with respect to environmental protection when disposing of batteries.

CAUTION !

Maintenance

In case of malfunction of this device, contact your local DraegerService or our Factory Authorized Technical Service Center.

The device must be inspected and serviced (preventive maintenance) by competent and factory authorized technical service representatives at regular 6 month intervals. A record must be kept on this preventive maintenance. We recommend obtaining a service contract through your vendor.

Maintenance or repair of the Evita ventilators and their installed options shall be performed only by Draeger authorized technical service representatives.

Intended Use

Evita 4 DC

A built-in DC power pack to maintain uninterrupted electrical power supply for intensive care ventilators
Evita 4
or
Evita 2 dura
with internal battery or with both internal and additional external battery.

To supply uninterrupted electrical power during at least 10 minutes in the event of a line power failure
– with internal battery.

For at least 1.5 hours
– with external 12V battery, 36 Ah; battery new and fully charged.

For at least 2.5 hours
– with two external 12V batteries, each of 17 Ah; connected in series; batteries new and fully charged.

For at least 4.5 hours
– with two external 12V batteries, each of 36 Ah, connected in series; batteries new and fully charged.

To supply electrical power during interhospital transport for up to 4.5 hours, e.g. in the Draeger Transport System
– with two external 12V batteries, each of 36 Ah, connected in series; batteries new and fully charged.

Preparation

Installation

WARNING !

Installation of the Evita 4 DC Power Pack may be performed by factory trained and authorized service personnel only.

Connecting External Battery

CAUTION !

Only use sealed gel type lead-acid batteries of sufficient capacity as specified, see page 20.

WARNING !

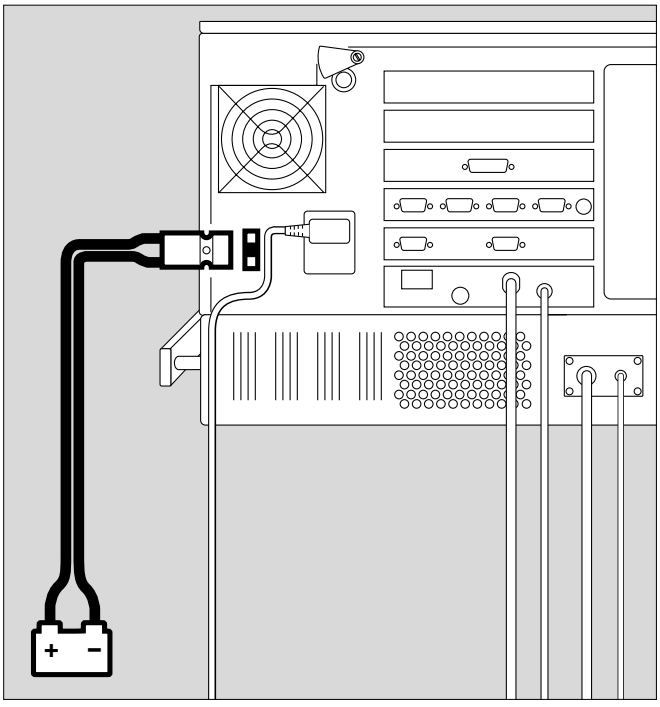
Only use rechargeable batteries !

Explosion hazard!

Single use batteries may explode when being charged with the DC power pack while ventilator is operating on line power.

- Connect external battery with battery connecting cable.

  Verify carefully correct polarity of connection.
- Connect plug to socket on the back of Evita 4/ Evita 2 dura.



WARNING !

Do not connect any devices that are operated by line voltage to the external battery connection socket of the ventilator.

The unit automatically detects the voltage of the external battery (12 V or 24 V).

Before First Use

It takes 24 hours to fully charge the battery of the DC power pack, therefore:

- Leave Evita 4/Evita 2 dura ventilator connected to line power for 24 hours – switched on and in standby.

Operation With Evita 4

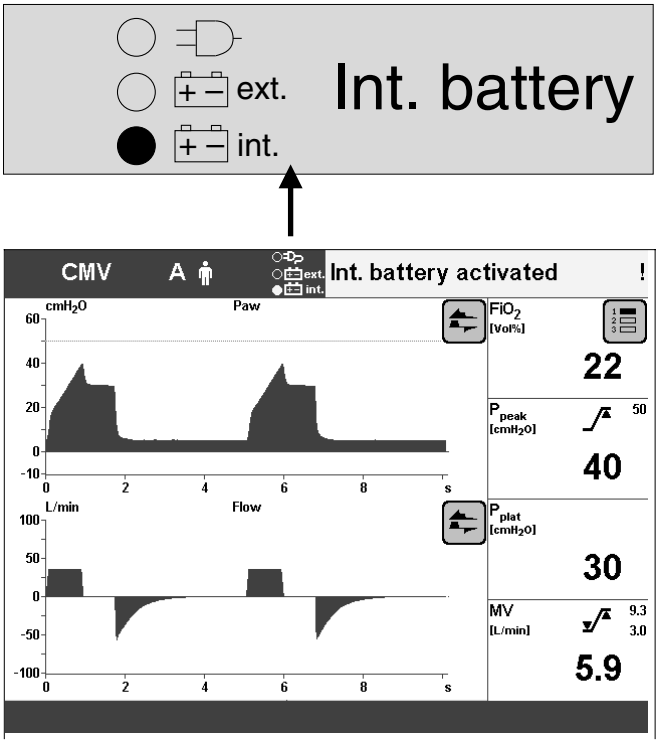
The internal battery of the DC power pack only reaches its full capacity after 24 hours.

- Evita 4 should therefore remain connected to a line power supply for at least 24 hours – switched on and set to standby.

Displays

The DC power pack with the type of battery currently in use is displayed in the top line of the screen, to the right of the ventilation mode.

Display (Example):



The display shows:

– Symbols for power sources

  line power

  external battery

  internal battery

  When batteries are fully charged, symbols in the display appear in green.

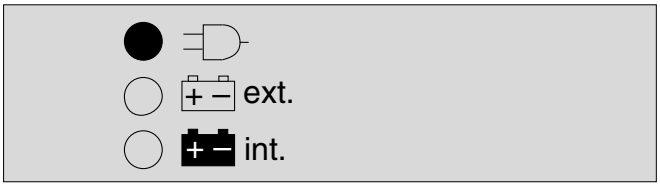
– Yellow "LEDs" to the left of the symbols indicate the power source being used to supply Evita 4.

– Messages to the right of the symbols give information about the status of the power supply, e.g. **Int. battery activated !**

Operating on Line Power

Evita 4 is being supplied with line voltage.
The "LED" to the left of the symbol for line power supply is lit yellow.

Display (Example):



Evita 4 on line power.
External battery not yet fully charged.
Internal battery fully charged.

The internal battery and any external battery that may be connected are only charged automatically during operation with line power.

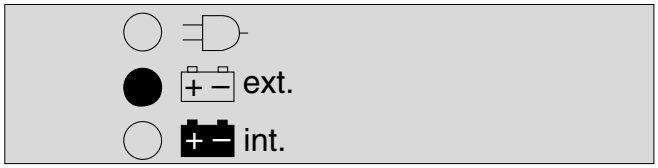
To charge:

- Connect Evita 4 to the power line and switch on.
- Leave the unit in standby mode or carry out ventilation.

Operating on External Battery

During line power failures, Evita 4 automatically switches to the external battery if connected. The LED-symbol to the left of the external battery symbol is then lit yellow.

Display (Example):



No line power supply.
Supply from external battery.
Internal battery fully charged.

NOTE: Switching to an external battery occurs without alarm message.

The operating time on an external battery depends on the level of charge and type of battery connected:
Two fully-charged 12 V batteries connected in series and each of 17 Ah, will supply the ventilator for approximately 2.5 hours.

When Evita 4 detects that the external battery is discharged, it automatically switches to the internal battery.

When line power is restored, Evita 4 automatically switches back to line power and charges first the internal battery and then the external battery.

- Check that Evita 4 is switched on.

The internal battery is not charged while power is being supplied from an external battery.

Therefore, as soon as possible:

- Restore line power to the ventilator so that both the internal battery and the external battery are fully recharged without delay.

WARNING !

Do not connect any devices that are operated by line voltage to the external battery connection socket of the ventilator.

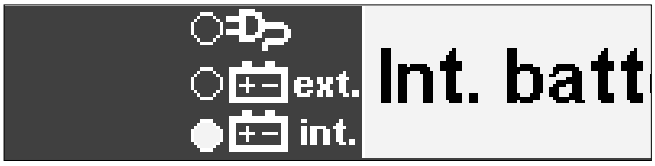
Operating on Internal Battery

Evita 4 switches to the internal battery to maintain the power supply during line power failures if no external battery is connected or the external battery is discharged.

The internal battery is only intended to act as an emergency power supply and not for normal operation.

The light diode to the left of the internal battery symbol is lit in yellow.

Display (Example):

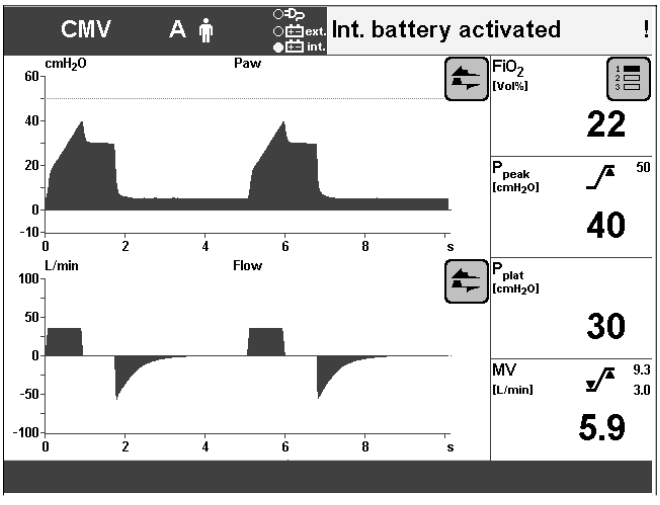


No line power supply.
No external battery (or external battery discharged).
Supply from internal battery.

When Evita 4 has switched over to the internal battery, the battery symbol is no longer shown as green.

On switching over to the internal battery, advisory message:

Int. battery activated !



The operating time for the internal battery depends on the level of charge:
With a fully-charged battery, the operating time is at least 10 minutes.

After 8 minutes of operation, a warning message is displayed:

Int. battery – 2 min left !!

- Restore line power within 2 minutes, or
- connect to a fully charged external battery.

At the end of 10 minutes of operating time, a warning message is displayed:

Int. battery discharged !!!

- Reconnect to a power supply immediately, using line power or a fully charged external battery so that ventilation is not interrupted.

When internal battery has been used:

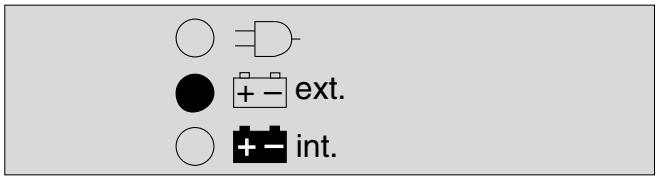
- Restore line power to Evita 4 so that both the internal battery and the external battery are fully recharged without delay.
- Make sure that Evita 4 is switched on.

Operating from an On-Board DC Power Source

For mobile use, e.g. in a motor vehicle.

Instead of an external battery, an on-board DC power source can be connected to the DC power pack.

When operating from an on-board DC power source, the "LED" to the left of the external battery symbol in the screen is lit yellow.



If the DC power source fails, Evita 4 switches to the internal battery without any interruption in the supply of power.

NOTE: The internal battery is not charged when an external battery is supplying power to the ventilator.

Therefore, as soon as possible:

- Supply Evita 4 with line power so that both the internal battery and the external battery are fully recharged without delay.
- Make sure that Evita 4 is switched on.

CAUTION !

Line power and an on-board DC vehicle power supplies must never be connected at the same time, as Evita 4 would attempt to charge the vehicle power supply.

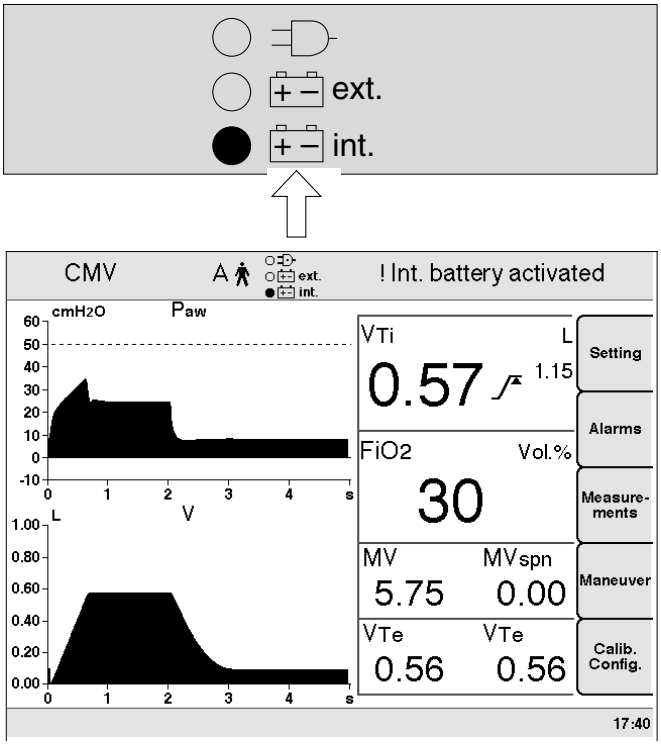
Operation with Evita 2 dura

The internal battery of the DC power pack reaches its full capacity after 24 hours.

- Evita 2 dura should therefore remain connected to a line power supply for at least 24 hours – switched on and set to standby.

Displays

The DC power pack with the type of battery currently in use is displayed in the top line of the screen, to the right of the ventilation mode.



Display (Example):

The display shows:

– Symbols for power sources

  line power

  external battery

  internal battery

  When batteries are fully charged, symbols in the display appear in black.

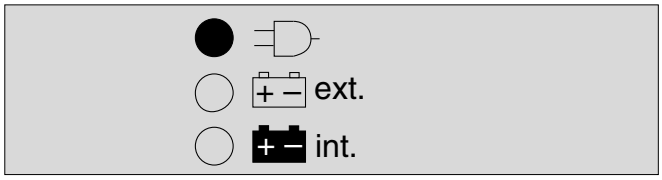
– Black "LEDs" to the left of the symbols indicate the power source being used to supply Evita 2 dura.

– Messages to the right of the symbols give information about the status of the power supply, e.g.
  ! Int. battery activated

Operating on Line Power

Evita 2 dura is being supplied with line voltage.
The "LED" to the left of the symbol for line power supply is lit black.

Display (Example):



Evita 2 dura on line power.
External battery not yet fully charged.
Internal battery fully charged.

When operating on line power, the internal battery and any external battery which may be connected are charged automatically.

The internal battery and any external battery that may be connected are only charged automatically during operation with line power.

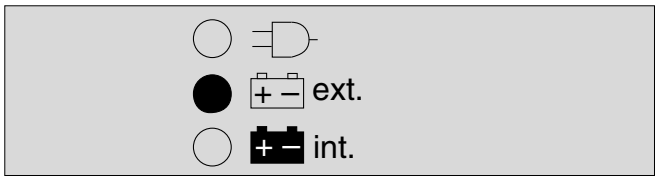
To charge:

- Connect Evita 2 dura to the power line and switch on.
- Leave the unit in standby mode or carry out ventilation.

Operating on External Battery

During line power failures, Evita 2 dura automatically switches to the external battery if connected. The LED-symbol to the left of the external battery symbol is then lit black.

Display (Example):



No line power supply.
Supply from external battery.
Internal battery fully charged.

NOTE: Switching to an external battery occurs without alarm message.

The operating time on an external battery depends on the level of charge and type of battery connected:
Two fully-charged 12 V batteries connected in series and each of 17 Ah, will supply the ventilator for approximately 2.5 hours.

When Evita 2 dura detects that the external battery is discharged, it automatically switches to the internal battery.

When line power is restored, Evita 2 dura automatically switches back to line power and charges first the internal battery and then the external battery.

- Check that Evita 2 dura is switched on.

NOTE: Internal battery is not charged while power is being supplied from an external battery or DC board net.

Therefore, as soon as possible:

- Restore line power to the ventilator so that both the internal battery and the external battery are fully recharged without delay.

WARNING !

Do not connect any devices that are operated by line voltage to the external battery connection socket of the ventilator.

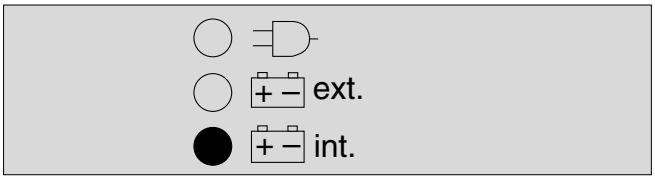
Operating on Internal Battery

Evita 2 dura switches to the internal battery to maintain the power supply during line power failures if no external battery is connected or the external battery is discharged.

The internal battery is only intended to act as an emergency power supply and not for normal operation.

The light diode to the left of the internal battery symbol is lit in black.

Display (Example):

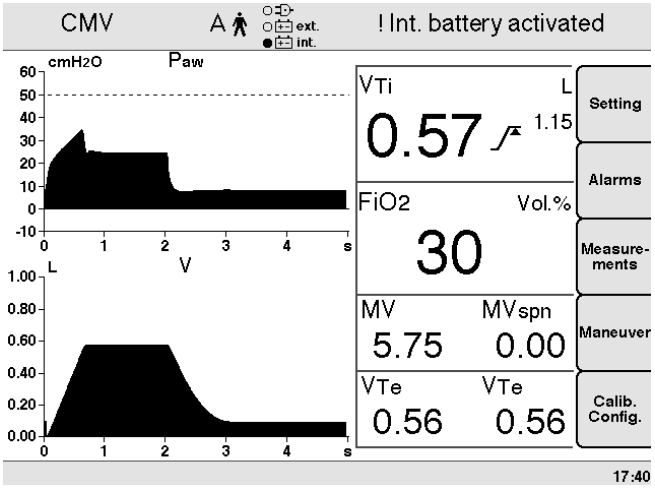


No line power supply.
No external battery (or external battery discharged).
Supply from internal battery.

When Evita 2 dura has switched over to the internal battery, the battery symbol is no longer shown.

On switching over to the internal battery, advisory message:

! Int. battery activated



The operating time for the internal battery depends on the level of charge:
With a fully-charged internal battery, the operating time is at least 10 minutes.

After 8 minutes of operation, a warning message is displayed:

!! Int. battery – 2 min left

- Restore line power within 2 minutes,

  or

- connect to a charged external battery.

At the end of 10 minutes of operating time, a warning message is displayed:

!!! Int. battery discharged

- Reconnect to a power supply immediately, using line power or a fully charged external battery so that ventilation is not interrupted.

When internal battery has been used:

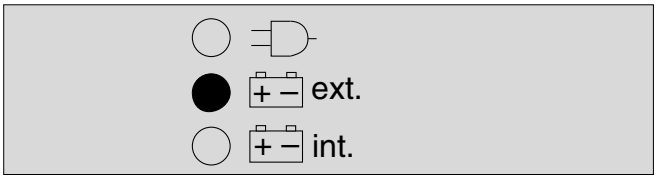
- Restore line power to Evita 2 dura so that both the internal battery and the external battery are fully recharged without delay.
- Check that Evita 2 dura is switched on.

Operating from an On-Board DC Power Source

For mobile use, e.g. in a motor vehicle, ambulance, helicopter.

Instead of an external battery, an on-board DC power source can be connected to the DC power pack.

When operating from an on-board DC power source, the "LED" to the left of the external battery symbol in the screen is lit black.



If the DC power source fails, Evita 2 dura switches to the internal battery without any interruption in the supply of power.

NOTE: The internal battery is not charged when an external battery is supplying power to the ventilator.

Therefore, as soon as possible:

- Supply Evita 2 dura with line power so that both the internal battery and the external battery are fully recharged without delay.
- Check that Evita 2 dura is switched on.

CAUTION !

Line power and an on-board DC vehicle power supplies must never be connected at the same time, as Evita 2 dura would attempt to charge the vehicle power supply.

Troubleshooting

Alarm messages in the alarm display field are displayed in hierarchical order.
If, for example, two faults are detected at the same time, the more urgent of the two is displayed.

The priority for alarm messages is indicated by exclamation marks:
Warning = Message with top priority **!!!**
Caution = Message with medium priority **!!**
Advisory = Message with low priority **!**

In the table below, the messages are listed in alphabetical order.
The table should help you to identify the cause of an alarm and to ensure rapid remedy of the problem.

Message		Cause	Remedy
Ext. bat. reversed poles	**!**	External battery connected with wrong polarity.	Connect external battery correctly, see page 9.
Ext. bat. too high	**!**	Battery with too high a voltage connected.	Connect 12 V or 24 V battery.
Int. battery activated	**!**	Because there is no supply of line power or external battery, Evita 4 is being supplied from the internal battery. Maximum operating time on supply from internal battery is 10 min.	Restore supply from line power or from a fully charged external battery within 10 min.
Int. battery discharged	**!!!**	Because there is no supply of line power or external battery, Evita 4 is being supplied from the internal battery The operating time on internal battery supply has elapsed.	Restore supply from line power or from a fully-charged external battery immediately.
Int. battery – 2 min left	**!!**	Because there is no supply of line power or external battery, Evita 4 is being supplied from the internal battery. Only 2 min. operating time from internal battery remain.	Restore supply from line power or from a fully-charged external battery within 2 min.

Maintenance

CAUTION !

Maintenance

In case of malfunction of this device, contact your local DraegerService or our Factory Authorized Technical Service Center.

The device must be inspected and serviced (preventive maintenance) by competent and factory authorized technical service representatives at regular 6 month intervals. A record must be kept on this preventive maintenance. We recommend obtaining a service contract through your vendor.

Maintenance or repair of Evita ventilators shall be performed only by Draeger authorized technical service representatives.

WARNING !

To avoid any risk of infection, clean and disinfect ventilator and accessories before any maintenance according to established hospital procedures - this applies also when returning ventilators or parts for repair.

WARNING !

Preventive Maintenance work on Evita ventilators and its components may be performed by trained and factory authorized staff only.

WARNING !

Never operate the ventilator if it has suffered physical damage or does not seem to operate properly. In this case always refer servicing to properly trained and factory authorized service personnel.

Maintenance Intervals

Preventive maintenance	Every 6 months by trained and factory authorized service personnel.

The internal battery and the external battery, if part of a Dräger product, are serviced as part of the scheduled preventive maintenance of the Evita 4 / Evita 2 dura ventilator every six months.

WARNING !

Treatment of batteries :

Do not throw into fire! Risk of explosion.

Do not force open! Danger of bodily injury.

Follow all local, state, and federal regulations with respect to environmental protection when disposing of batteries.

Technical Data

Electrical connections

Input DC voltage	10 to 30 V DC
Input current	
12 V battery	typically 13 A, max. 30 A
24 V battery	typically 6 A, max. 15 A

Performance data

Operating time when no line power is available and external battery is fully charged	
12 V battery 36 Ah	about 1.5 hours (e.g. with 1 x gel rechargeable battery 12 V/36 Ah)
24 V battery 17 Ah	about 2.5 hours (e.g. with 2 x gel rechargeable battery 12 V/17 Ah)
24 V battery 36 Ah	about 4.5 hours (e.g. with 2 x gel rechargeable battery 12 V/36 Ah)
Operating time when no line power or external battery is available, or external battery is discharged	typically 17 minutes at least 10 minutes

External batteries

The battery capacity depends on the condition of the battery and on the ambient temperature.
The ventilator cannot control the battery capacity.

See note on page 21.

Type	Lead batteries, sealed, gel-type
Min. capacity recommended	
12 V battery	30 Ah (note charging current for battery)
24 V battery	15 Ah (note charging current for battery)
Charging time	
12 V battery 36 Ah	8 hours
24 V battery 17 Ah	5 hours (2 x gel rechargeable battery 12 V/17 Ah)
24 V battery 36 Ah	4 hours (2 x gel rechargeable battery 12 V/36 Ah)

Internal batteries

Type	Lead batteries, sealed, gel-type
Charging time	≤ 1.5 hours
Class 1	with internal power source, also via external low-voltage connection

Description

External Batteries

Both 12 V and 24 V batteries can be used as external batteries.

The use of 24 V batteries (2 x 12 V batteries connected in series) with a minimum capacity of 15 Ah is recommended.

With batteries of this kind the effectiveness of the DC power pack and the operating time available is significantly higher than for 12 V batteries with comparable capacity.

Manufacturers: Any commercially available, rechargeable lead acid, gel-type battery may be used, such as:

Panasonic	LCL12V24P (2)
	LCL12V33AP (1 or 2)
	LCL12V38P (1 or 2)

Battery Charging

The DC power pack automatically identifies what type of external battery has been connected.

Charging currents	12 V battery:	approximately 5.5 A
	24 V battery:	approximately 3 A

When the battery is fully charged, Evita 4 switches to trickle charge. Trickle charge is accomplished with short bursts of current at the nominal voltages.

Charging Times

The charging times under "Technical Data" apply when batteries are recharged immediately after being discharged.

NOTE: If batteries have been allowed to deep discharge several times without substantial recharges in between, charging times will increase significantly.

Battery maintenance

For maximum service life:

- Always charge the battery fully, and if possible do not deep discharge.

When the DC power pack is not in use:

- At the latest after 1 month, connect the unit to the supply line and switch on for at least 2 hours to charge the internal battery.

Batteries are wearing parts. Depending on their degree of use they must be periodically replaced.

- **To prevent premature wear, avoid deep discharging the batteries.**

Priority of Power Sources

The DC power pack automatically prioritizes its use of power sources:

1 **Line power**
The DC power pack automatically switches over to line power when available and charges both the internal and external battery (the unit must be switched on).

2 **External battery**
During line power failure.

3 **Internal battery**
During line power failure and discharged or disconnected external battery.

To use as much energy as possible, the unit switches from internal to external battery as soon as the external battery has recovered. This function is only intended for emergencies and can lead to deep discharging.

As soon as possible:

- Operate the unit again with line power or with a fully charged external battery.

NOTE: When operating from an external battery or an on-board DC power supply, the internal battery is not charged. Discharge is, however, prevented by trickle charging.

Disposing of the internal battery

The internal battery of the Evita 4/Evita 2 dura contains pollutant substances.

In the Federal Republic of Germany, under the Used Battery Order, the end user is legally obliged to return batteries containing pollutant substances to the point of sale or to the collection points of officially authorised waste disposal operators:

The battery in the Evita 4/Evita 2 dura must therefore be removed by Dräger Service before disposing of the used unit.

In other countries, the relevant national waste disposal regulations must be observed.

Ordering Information

Item/Description	Order No.
DC power pack for intensive care ventilators Evita 4 / Evita 2 dura	84 13 034
Gel rechargeable battery 12 V/36 Ah	18 28 932
Gel rechargeable battery 12 V/17 Ah	18 43 303
DC connecting cable	84 13 135
DC connecting cable Evita Mobil	84 11 822

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These Operating Instructions apply only
☐ to **Evita 4** with Serial No.:
☐ to **Evita 2 dura** with Serial No.:

(check applicable)

If no Serial No. has been filled in by Draeger these Instructions for Use are provided for general information only and are not intended for use with any specific machine or device.

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5th edition - July 2001
Subject to modifications